

AVIATION

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Night scene on the Spokane, Wash., airport, where the 1927 National Air Races are to be held

VOLUME
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SPECIAL FEATURES

NUMBER
11

THE FAIRCHILD ORGANIZATION
THE KEYSTONE ALL-METAL BOMBER
THE BRISTOL "JUPITER" SERIES VI ENGINE

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under Act of March 3, 1879

The Ryan Brougham

Five Place Monoplane



Cruising Range 750 miles

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Fully loaded the usual performance of this type monoplane is at once apparent, quick take-off, slow landing speed, high cruising speed, and excellent maneuverability.

Upholstered in silk mohair with the entire cabin insulated with Balsam wool, owners are finding this newest product of the Mahoney Factory not only efficient and economical but unusually comfortable.

"The same model that Colonel Lindbergh flew, adapted to passenger carrying."

WITH SUPER-INSPECTED J-S-C MOTOR \$9,700.00

B. F. MAHONEY AIRCRAFT CORP.

SAN DIEGO, CALIFORNIA

*Why Ford monoplanes
are made entirely
of metal*



THE purpose of commercial planes is earnings. Naturally, these come only after all expenses. Consequently the first step is keeping expense at the minimum. Reduction of expense to the air-line operator is one of the reasons Ford monoplanes are built entirely of metal.

The metal that goes into Ford monoplanes does not deteriorate as wood and fabric must. It doesn't rot or warp, stretch or tear. Right there is a reduction in maintenance. Also increases of more continuous service.

Fit of replacements is another advantage. Every part of a Ford monoplane can be replaced direct from stock with no time or labor expense in adjusting to fit. As soon as ground-work is over is as soon your plane can be in the air—earning . . . maintaining schedules.

Here is another saving you may not have considered. Wood varies

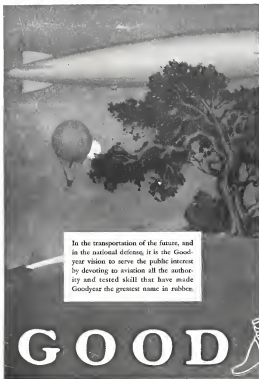
widely in strength. One piece of wood will stand forty thousand pounds. Another, apparently exactly like it, breaks at twenty-five thousand. A wide safety-margin must be allowed. That is weight which takes the place of payload. Metal, on the other hand, can be accurately gauged, and excessive safety-margins are not needed. The greatest possible percentage of your lift is carrying profit-paying loads.

The superior rigidity and strength of metal wing construction removes the need for many trusses and braces inside, and struts and wires outside. Not only is the final weight lighter than wood and fabric construction, but also parasite resistance is greatly

reduced; lift and speed are both increased.

The use of all-metal construction is but one of the many instances of the steps taken to make Ford monoplanes capable for successful and continuous air-line operation. A more complete idea of how Ford monoplanes meet the needs of air-line operators may be obtained from our new booklet, "The New Era of Transportation," which will be mailed to you upon request. In addition, this booklet contains much valuable information gained from practical experience in operating the Ford air-line. If still more information is desired on any phase of experimental or operations work connected with commercial flying or airplane building, it will be furnished to any who wish it, free of cost or obligation.

THE STANTON METAL AIRCRAFT CO.
Div. of Ford Motor Company
Dearborn, Michigan



In the transportation of the future, and in the national defense, it is the Goodyear vision to serve the public interest by devoting to aviation all the authority and tested skill that have made Goodyear the greatest name in rubber.

GOOD



YEAR

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**Increased Flying Safety
Increased Safe Flying Life
Reduction to Minimum of
Forced Landings
Decreased Cost of Operation**

THESE must be the keynotes of tomorrow's planes.

The exhaustive research program of The Glenn L. Martin Company, launched in the mid-summer of 1926, carried forward without pause or interruption since that time and still in aggressive progress, is aimed at these four accomplishments. No detail of design, of construction or of material is being accepted on past precedent—each problem is being attacked and solved afresh.

Achievements already to the credit of Glenn L. Martin engineers emphatically confirm the soundness of the program.

THE GLENN L. MARTIN COMPANY
Builders of Quality Aircraft Since 1909
CLEVELAND, OHIO



**Wasp & Hornet
Leadership**

- One piece Master Connecting Rod and Built-up Crankshaft
- + Divided and Forged Aluminum Main Crankcase
- + Grouping of all accessories in the rear of the engine
- + Complete enclosure of all working parts

Forged and Divided Aluminum Main Crankcase

The Wasp
475 H.P.
at 1900 R.P.M.
Weight 695 lbs.

The Hornet
521 H.P.
at 1900 R.P.M.
Weight 719 lbs.

Pratt & Whitney engines feature a forged instead of cast aluminum main crankcase, consisting of two identical pieces facing each other and held together by nine through bolts, one between each two cylinders.

The forging increases the strength two-fold and eliminates the danger of casting defects. The design divides the load equally between the two main bearings and provides rigid crankshaft support.

This basic feature in both the "Wasp" and the "Hornet" has paved the way for high powered, big displacement air-cooled radials and is making possible the broad application of this type of engine.



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HARTFORD, CONNECTICUT

DEPENDABLE ENGINES



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Learn As Other Pilots Have — the value of buying a WACO Airplane

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They chose the WACO because it gave them more performance and safety features. Because production at WACO plants assures them of immediate service on replacements. The New WACO Ten airplanes all possess models in style, performance and safety.

Its quick take-off, fast climb, high top speed and ease with which it does all that you ask of it in the air makes it the 'C' of Pilots everywhere.

Its split-type, hydraulic shock absorbing, landing gear takes all the unpleasantness out of landings.

Its sturdy fuselage and wing sections, engineered to withstand motors from 90 to 250 horse power, give you more safety than ever before.

Ask Pilot Selling WACO or for the name of our nearest distributor and he will point WACO superiority to you.



MANUFACTURED BY ADVANCE AIRCRAFT CO., TROY, OHIO



Now you can learn Aviation And Make Big Money

At home—in your spare time—grasp all the fundamentals. You can do it. You can fit yourself for one of the many real opportunities—in the air and on the ground. Right at once, under direction of Lieut. Walter Hinton, while the men who know Aviation are comparatively few.

Aviation, is the great, new industry of the age. The time to get into it is now, when it is young. Think of the fortunes that can be made by starting early in the Automobile business—the Telephone, Radio, and the Moving Picture and Radio. Men who grasped themselves in the fundamentals of these businesses, in their practical everyday work, and progress, made good earnings and rapid progress as the industries grew.

The recent growth of Aviation is prophetic. It is the kind of expansion that means health, solidity and permanence—it is commercial expansion. Most, express and passenger lines are in operation, great factories are building planes by hundreds for both pleasure and business use. Every city and town is planning an airport. Over 4000 in operation now—8000 privately owned planes.

The industry is growing so fast that there is a positive hunger for trained men in all its branches. But without training, no man is wanted.

Aviation Institute can give you the necessary knowledge. It is easily acquired in spare time, at home. All you need is a desire to learn. Lieut. Hinton, and his staff of experts will guide your instruction from beginning to end. There are many positions open as mail pilots, commercial fliers, instructors, as well as plenty of well paid

Lieut. Walter Hinton
First Lieut. U.S. ArmyGen. Lloyd Austin Hinton
Major General U.S. Army

...and many other positions. You can learn all the fundamentals of Aviation in your spare time, at home. All you need is a desire to learn. Lieut. Hinton, and his staff of experts will guide your instruction from beginning to end. There are many positions open as mail pilots, commercial fliers, instructors, as well as plenty of well paid

positions, inspectors, riggers and mechanics on the field—to say nothing of any number of openings in the different factories. But aircraft manufacturers must have trained men. There must be no mistake in the construction of a plane.

On the flying field or at air ports, proper training is essential to the successful operation of aircraft. Mechanics, riggers, inspectors and other specialists must know the fundamentals of aviation to be responsible.

The Aviation Institute Course teaches you everything you need to know, right up to the point of actual flight instruction in the air. All the principal ground work, so absolutely necessary to quality, is secured in a comparatively short time at home. When you graduate from the Institute, you are ready for your opportunity in Aviation.

If you wish to become a pilot, find flying instructions are given in all parts of the United States in cooperation with the Institute. Free to ten hours with an instructor and you own it alone.

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There are thousands of vital facts about Aviation in our new book. Profusely illustrated, authoritative, right up to date. 24 pages of interesting material that will change your entire career. Read for it now. Don't delay, use coupon.

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WALTER HINTON, President
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ing. At first, machines were tested. Later, Fairchild hired its own pilots and bought machines, and still later, its special machines were built to meet the exacting needs of aerial photography. In this photographic work, a great deal of flying was done in all sorts of places and in all parts of the country. These airplanes obtained from Mexico to Canada. From this extensive flying, an intimate knowledge was obtained of the requirements of a commercial airplane. The Fairchild organization decided to specialize this knowledge and took over the plant and equipment of the Hopy Aircraft Co. at Farmville, N. C.

Total Floor Space of 60,000 Sq. Ft.

The "FC 2" Fairchild Cyber Monoplane was made—one of the first commercial machines with provision for aerial photography. It was flown in the Ford Tour last year. A modification of it, known as the "FC 2" is now being produced. Additional airplane features have been purchased, and new floor space of 60,000 sq. ft. is being used. Best production methods are being applied and planes are being turned out at the rate of two a week, which is considered something of a record for a plane of this class.

Shortly after the airplane manufacture was started, the Fairchild organization studied the need for a light, cheap, reliable air-cooled motor. They realized the difficulty and expense of developing such an engine and looked around for the one which was most fully developed and which could be purchased. The United States Government had spent some years and a large sum of money on the development of the Curtiss motor—generally for training planes. Arrangements were made whereby Curtiss came into the Fairchild organization as vice president and chief engineer of the Fairchild-Denison Engine Corp. For over two years, work on the motor which the Government was considerably continued. In April, 1926, it was brought to a successful conclusion by the first test flights of the Fairchild-Denison motor. For the past several months, continued testing of the engine has gone on, both in the air and on the ground, and the engine is now in production.

Canadian Company Formed in 1922

The Fairchild organization has always given careful consideration to Canada as well as to home markets. In 1922, the Fairchild Aerial Surveys Co. of Canada, Ltd., was formed to do aerial mapping in Canada. This organization has gradually expanded work, now it includes all phases of mapping and transportation work as known in Fairchild America, Ltd.

An interest was obtained in the most prominent Mexican company—the Cia Mexicana de Aviacion.

Local testing of planes and flying of photographs is enabled on a local operating company, known as the Fairchild Flying Corp.

All of these activities are brought together and coordinated

by the Fairchild Aviation Corp. This organization is one of the largest in the aviation industry. Its employees cover three hundred acres, and has factories in New York City and Farmville, N. C. Locally equipped branch offices for the production of surveys and mapping of which Fairchild products are maintained in Dallas and Los Angeles. Complete repair shops are maintained at Grand Rapids, Quebec, the base of Fairchild Aviation, Ltd. At No. 1725 E. Street Northwest in Washington, D. C., the Fairchild Company has an office under the direction of Capt. A. E. Knott. From time to time, other organizations will be acquired or developed by the Fairchild Aviation Corp. Its name and reputation is actually a great asset in its advancement to new products.

A. M. Fairchild is president of the Fairchild Aviation Corp. and its largest stockholder. Frank Knott, who was formerly president of the Hamilton Engine Co. and before that president of the Hamilton Engine Manufacturing Company, is vice president of the Fairchild organization and prominently identified with it. William A. Schneider, C. V. Whitney, Robert Lane, Jr., Col. John MacKenzie and Harold Whitehouse are also identified with the organization as stockholders. Fairchild Aviation has a paid-in capital of \$175,000.

Travel Firm to Conduct Air Tour

On Sept. 21, Thomas Cook and Son will conduct a six-day air tour. Arrangements have been made by Thomas Cook and Son for 25 light passenger-carrying planes to carry a special party of six tourists from eastern cities to Chicago and return. The planes will start from New York, Boston and Philadelphia on the morning of Sept. 20 and will fly to Chicago. Look will be served in the air, making of the journey. On arrival at Chicago a special dinner will be provided at the Stevens Hotel. The air travelers will then attend the Dempsey-Tunney fight, where they will sit in a special section of stands reserved solely. The night will be spent in hotels in Chicago and on the morning of Sept. 22, the return flight will be made to the home cities of the travelers. The planes to be used are large twin engines equipped from four to eight persons each.

French Airman Claims New Altitude Mark

According to a report from France the French altitude record was broken on Aug. 20 when the French aviator Collet reached a height of 29,000 ft.

Upon landing at Le Bourget Field Collet made the statement that he would never make another attempt in which he had passed the height of 29,000 ft. one way and back because partially and he became unconscious.

He put a confirmation of Collet's statement but he not been made. The altitude former record was 26,000 ft.



The above photograph was placed at the bottom of page 583 in the Aug. 25 issue of AVIATION and described as the new Pottier triple engine (Wright Whittcomb) multi-engine plane in which the late Capt. Pottier was killed. The plane is provided with two 100-hp. Whittcomb "Wright" air-cooled radial engines.

The Kirkham "X" Racer

A Seaplane Especially Designed and Built for Lieut. Alford Williams, U.S.N., and Powered With the New Packard 24 Cylinder 1,200 Hp. Engine

THE KIRKHAM "X" RACER, powered with the Packard 24 cylinder 1,200 hp. engine, is perhaps the lightest powered single engine plane in existence. This airplane, which virtually is an engine with a plane attached, was recently designed and built for Lieut. Alford J. Williams, U.S.N., by the Kirkham Aircraft Co. of Garden City, L. I., N. Y. It has a monocoque fuselage and plywood wings fitted with wing sections. At present the plane is equipped with provision though provision is made for a landing skid. A group of New York business men, with the Packard Motor Co., financed the building of the plane as an endeavor to regain for the United States the world high speed record for land and sea planes.

In general appearance the plane presents a conventional racing airplane completely blank of the nose due to the 24 cylinders of the engine being arranged in an "X" with 12 cylinders in each bank. From the engine backward, the fuselage gradually tapers to a sharp point at the rudder. Though in side view the fuselage appears quite flat at the nose, it has an excellent stream line form.

The fuselage is of monocoque construction, using two ply spruce for the rear part and four ply spruce from the engine as far back as the rear of the cockpit, thus giving a much stronger structure at the forward part where the stresses are greatest. This plywood covering is attached to narrow balsa blocks cut out of solid vitex. It is attached by screws and glue and then covered with fabric having a smooth surface. The fuselage is finished in lacquer.

The pilot's seat is part of the structure being built into a bulkhead. It is partly covered over by a small wind shield, still leaving an exceptionally large range of vision necessary at the tremendous speeds at which the plane will travel. The tail fin is carried partly in a space between the cockpit and the engine and is rack position.

The engine mount is perhaps one of the most interesting

features of the plane. At each side of the engine are three points of support of eight studs each. From the forward support on each side is a strong monoplanar steel strut to the piston. Two more from the point where the strut meets the piston traverse the head to the wings. The other two mounting points on the engine are supported by Cardan-like tubes extending the fittings on the forward bulkhead. Cross bracing is by wires at the rear of the engine. Detachable tubes for the engine mount are attached to a dashman fitting that is held by a wedge fit in a steel fitting mounted on the side of the engine. The entire engine mount is very rigid and with the engine side open there is no movement of the engine relative to the plane.

The wings are of multi-spar construction covered with two ply spruce. The spars are of solid spruce sections with plywood, the covering stretched and glued in place. An wing radian cover almost the entire surface, only the tips are covered with fabric. The wings are attached at three points by tapered bolts at three of the spars. These bolts hold steel fittings on the spars and the fuselage bulkheads. The tail surfaces are of balsa construction in the wing being of multi-spar construction covered with two layers of spruce.

Each airframe part is built up of a sheet of balsa with a small piece of vitex at what might be called the leading and trailing edges. On each side of the fuselage sheet and glued to the vitex piece at the ends is a layer of spruce. Short inserts through the spruce and balsa unite the structure more rigid and tend to hold the layers together. The entire strut is covered with fabric to give it a smooth finish.

There are four struts controlled by levers taken through the wings. A hand pump in the fuselage provides the necessary action.

The wing radiators consist of about 11,000 ft. of brass tubing serving almost the entire wing surface. The brass tubes



An interesting view of the Kirkham racer showing the mounting of the new 100-hp. Packard engine. Note the engine struts on the right and the left. It consists of four aluminum struts joined in a sturdy, but simple, way, enabling the lowest cost of the structure.



Rear quarter view of the Fairchild "K" biplane near during the earliest assembly at the plant.

approach a T-tail, with the tail against the wing surface. They are soldered to leaders at the leading and trailing edges and to brass rings attached at each joint. The leaders are tapered with the tubes collimated to provide an even flow throughout the system. The solder on the inner half of the lower wing is used as an oil seal, while the rest of the surface is used for water sealing. Under test this indicator has proved itself able to stand the enormous pressures of high speed flight.

The floats are of the common Vee bottom type and by turning the curve of the bottom so that the floats are nearly level, the spray into the propeller is eliminated.

It has an unusually long tail, the shape of which has been carefully determined to prevent any tendency to porpoise.

These features are of wood construction with a duralumin bottom. The structure is similar to the monocoque type with water tight bulkheads on which wood surfaces are fastened. The duralumin bottom was specially treated and the entire structure painted over. The floats are attached to the plane by shock absorbers, struts, fitted to give them a stress line form.

At the lower engine mount fittings, are studs for mounting an undercarriage if the plane is to be used as a land plane. The small fin below the floats can be replaced by a tail skid.

Stout Plans Detroit-Cleveland Air Line

The Stout Air Service, Inc., of Detroit, Mich., has made formal announcement of its proposed operation of the Detroit Grand Rapids Line, to be replaced by a new line between Detroit and Cleveland.

The Detroit-Grand Rapids Air Line has been in operation for over a year, and during that time maintained a schedule of 50 per week, rain or shine. During that period of operation there was not the slightest upset in schedule and the 10 per cent. deviation in schedule was due to two forced landings, caused by weather conditions. On one of these occasions, the trip was completed after a delay of one half hour until the plane had cleared.

A statement issued by Stanley B. Skowron, general manager of the Stout Air Service, Inc., relative to the new line is as follows:

"The Stout Air Service, Inc., suspended service on the Detroit-Grand Rapids Air Line Saturday, July 30, the end of a year of experimental operation, until such time as special equipment is available to extend the line across Lake Michigan to the Twin Cities in accordance with the company's original plan of operation. Meanwhile, beginning about Oct. 1, 1927, a new line will be operated between Detroit and Cleveland."

"The Grand Rapids Air Line has served as our experimental laboratory for testing equipment, rates and schedules so that further operations could be based on fact and experience rather than opinion. The only persons here of operating a passenger air line in the United States. Our attitude did not pay operating expenses, but they did pay more than we estimated and we consider the experience gained more valuable than a profit to start with."

"Cleveland was to be the starting point in our original plan of operation, eleven years ago, but there were not enough planes of the Stout-Park type then available to handle the traffic anticipated and the Grand Rapids line was more suited to our requirements. Consequently, we began operations there and continued them with one plane until recently when two more planes were added to the service."

"Between Detroit and Grand Rapids we have carried over 2,000 passengers without the slightest injury to a passenger or any of the operating personnel. Because of the strategic location at the two cities, the Detroit-Cleveland service will handle the greatest saving of time that can be made between any two cities in the United States. It will cut the fastest train time by half. The fastest train between a fellow passenger train and at each city, requires five hr. and fifteen min. The airplane service will operate on a schedule requiring only two and one half hours for the trip, allowing thirty minutes at each city for transportation to or from the airport."

"The Grand Rapids Line service will be resumed coincident with our proposed extension across Lake Michigan to St. Paul and Minneapolis. This will take place in soon as special planes can be built and when a complete radio beacon and lighting service is installed."

"The Detroit-Cleveland line will operate on a two trip per day basis. This will greatly facilitate departure, in that one can leave Detroit at 4:30 in the afternoon and arrive at Cleveland in time for dinner, allowing time between airport and town."

"The flying conditions between these two points is ideal, and affords a wonderful view of the country. Part of the trip will be made along the Lake shore, and the remainder through farm lands and rolling hills. The Stout-Park single and tri-motor planes will be used in this service, each accommodating between eight and twelve passengers."

Fairchild Methods in Airplane Production

By SHERMAN M. FAIRCHILD

President, Fairchild Aircraft Corp.

WITH THIS increasing market for airplanes and the vast expanding field of their usage, the type of airplane built has become a matter of increasing importance. Not only are purchasers regarding airplanes of proper design, construction and performance, but airplanes must be produced under certain methods and distributed under certain conditions. In full realization of these demands, the Fairchild Aircraft Manufacturing Corp. has been concentrating since its start in 1916 on the development of an organization as well as a product. Their present plans show this line a most interesting and one that is right at the factory at Farmingdale, Long Island, to realize the advantages.

The distinctive feature of the Fairchild Aircraft Manufacturing Corp. is the completeness of its organization. Practically every part of the airplane is made in its own factory by departments especially organized for a particular operation. These departments are arranged so that the work passes through them in logical sequence. This has been possible for the reason that when large scale production was started, the company was relatively new, and therefore could arrange its buildings and equipment in the most efficient manner. The company was not hampered with the necessity of adapting obsolete or old machinery to new needs.

It has been the aim of the Fairchild Aircraft Manufacturing Corp. to create nothing in other design or manufacture in an efficient manner. A better product than is now in use is to offer a superior article at a reasonable price by quantity production and careful organization of factory methods. Harold M. Knapp is vice president and general manager of the Fairchild Aircraft Manufacturing Corp. and was for many years in the automobile business, having at one time been production manager for the Buick Motor Car Co. Through his experience, it is only natural that many of the methods used in the automobile business are found in the Fairchild plant. The work is divided into numerous operations, each with its own production department and individual



Close up of the job's engine in a White Wheelair Fairchild airplane.

assigned workers. Jigs and fixtures are used throughout, making it possible to maintain standardization of parts. Finally, assembly is carried out progressively and in a straight line, with all operations thoroughly completed by the production department whose duty it is to guard against delays.

A trip through a well organized airplane factory is a most interesting experience and we should like to take the readers out to Farmingdale for such a purpose. First, we will visit the engineering department which occupies a detached building of its own where quiet can be maintained. The difficulties and production men are here over their usual blueprints, slide rules and drafting boards. The individual drafting boards are separated by wooden screens so that a discussion with one engineer will not disturb the work of another. The screens serve also to fence large blueprints and other data



From quarter front view of the Fairchild "AD" biplane, single monoplane equipped for operation at a land plane.



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segment them. In contrast to many organizations, the product line-up and design of the various organizations in the sales and production departments. The function of the engineering department is simply to carry out ideas in the manufacturing department. The engineering department is not responsible for supervising the manufacturing department as it was not intended to be the place. The place is full of ideas. While there are ideas which must only have originated from someone else, the engineering department is not responsible for creating itself. In order that the production and engineering departments can work in complete harmony, one must be assigned to coordinate for the shop and engineering departments. It is a task that is sometimes which puts you responsible to coordinate the work done in the engineering department. There is a useful device at the engineering department in terms of engineering, not experimental design, and one can do design of products.

Prof. Alexander Kiknadze of the Georgian School of Architecture is primarily a consulting engineer, and many of the aerodynamic developments found in the Fairfield Mustang are the result of his ideas and extensive wind tunnel testing carried on at New York University.

Uniformity Makes for Easy Assembly

During the carpenter's operations on the wood m² in which the greater part of the wooden parts are made. In addition to the large array of usual wood working machinery, many special ligs and fixtures are installed. With these, quantities of composite ribs, beams and various members are quickly, raised and corresponding is every fitted to the template required. This absolute efficiency makes the assembly a comparatively easy matter, and it is not long before we are the promised wing on its way to the covering and drying shed.

This department recognizes a building considerably larger than the other two. It is a new building, and upholstery is done and the wings, but surfaces and interiors are more than just new. The department has a new set of new design and three of its new aluminum pigment are applied in full according to the U. S. Air Corps Specifications. Besides painting equipment being used. Upon completion the parts are forwarded to the main building for assembly.

We will now take the visitors to the far end of this new building to where the general office are located. They are well arranged in their new equipment and the various executive functions and the planning, producing, control and accounting are here performed. Proceeding to the shop we find the first three devoted to fuel work. Rows of benches supplemented with pneumatic machines of all sorts combine the equipment and modern are everywhere busy cutting, drilling and sanding on the many different kinds. We next come

the selling departments where the most expensive fixtures are sold in the manufacture of the two-piece and knit uniforms. These fixtures are so arranged that stock tubes, already cut to length, are simply slid onto the framework and are automatically held in place by a spring. A power roller then takes the tube, tightens it and is followed by a steam roller completing the joint. To finish, therefore, requires only the removal of the neckline and various sections of the knit - collars are made separately and later joined to the neck. The final touch is added in the necker of women's by the attachment of another segment, or collar piece. All of the framework is of welded steel tube reinforced wherever it has been entirely encased.

Assemble the Most Intensive Phase

Contrast is located between the smaller and larger molding buttons, is a most extensive molding shop. Lathes, milling machines, drill presses, shapers, rabbet machines, stamping machines, in fact, members of almost every conceivable type are here assembled for the making of jigs, fixtures, tools and parts. The completeness and arrangement of this machine shop, composed as it is of all new equipment, gives a most impressive appearance and emphasizes the thoroughness with which the Fairchild plant has been altered.

Probably, the most interesting place of all, however, is the assembly. Almost 2,000 sq ft, a half of the building, is reserved for this purpose and one can here see over a dozen airplanes in their various stages of assembly.

On the right, the rigid overage frames are being brought in to remove their steel shiftnuts, the Bowens and roller-bearing, while on our left the check room continues to add nuts to the new materials, the finished parts ready for assembly. Hydraulic oil lines (checkrooms were not intended to be replaceable manufacture). Each part comes to the unskilled worker here in number and bits of parts are quickly supplied on request, for any of the components is available.

A Separate Investigation Department

Epilobiont and covering are next accomplished. The plane is then moved forward to connect to the Wright-Walsh engine together with the gas and electric systems. Landing gear and tail surface controls are also added at this stage. All that then remains is the attachment of a set of wings. The interchangeability of parts has been so perfected that throughout assembly the component parts are put together without altering or fitting out even in the case of the wings it has not been found necessary to specify a particular set. Thus, our box deals with the finished airplanes leaving the factory for the test field.

It is, too, the greatest advantage of these methods, however, lies in the possibility of inspection. No great cost the opportunities offered that the Fawcett Manufacturing Corp.

September 18, 1928

has found it feasible to install an entirely separate inspection department independent of all other departments and reporting directly to the management. Not only are the new men termed to workmen, expected both as to quality and adaptability to their specific use and the finished workmanship inspected, but also the various methods used by the workers in turning out the result. Thus the department serves as a check on the purchasing, manufacturing and engineering departments also.

Because of the productive methods employed in manufacturing it is further possible for the expenses to take place progressively following each ordered exercise down to the



The Jaws® "All Purpose" sail is designed with the wings folded.

disputed arena, where a final, overall examination is made. This encompasses inspection, interference, in theoretical terms, and the final decision. The final decision is not a simple and a complete notion is laid against the important entities in every case. Then before the airplane leaves the factory the definition is seen that every one of the many hundred or more items that are produced are not the same, but they are based slightly but far apart. In this way even the many copies is maintained that that required by the U. S. Army, many many specifications. Finally, a test pilot takes each airplane and flies it, and then the airplane is sent to the factory, where after another thorough examination before delivery is made. It is worthy of note that Frederick H. Guinn, head of the department, has been identified with numerous cases with various aeronautical research. He has a record of 2000 he is the sky as a pilot. Frank L. Van Meter, shop supervisor, was the second year old assistant supervisor for the

Phase Effects Manufacturing Method

The Yokohama replaceable skirt belt utilizes the methods used in its manufacture. It embodies attributes of performance outstanding dependability and many structural features of practical merit.

The various phases of its design were completed by the corps of engineers working on the factory staff. These were brought together from factories and test field, throughout the country and were selected because of their technical knowledge and experience. Supplementary to the plans of the factory staff, additional counsel was obtained from a number of pilots, both experienced in the industry.

The alouatta is a catlike monopithecine, powered, as has been mentioned, with a Wright Whetstone engine. Ample tail and ulnar surfaces afford easy control. The wings can be readily folded so that the alouatta occupies, like a flock of the common parakeet, more absolute interlockingness of parts is a factor which cannot be overestimated. It has been suggested that it is well suited to phlogon, photogony, survey and patrol flying as well as the transportation of seed, eggs, and messages on a constant basis. The

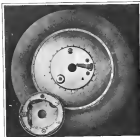
in name, the All-purpose, when manuscript has been well shown.

Important in the methods used and organization was the determination of responsibility, cost and uniformity in employee assignments; these factors were further refined by the gradual elimination of the variable in change. The Fordland Manufacturing Corp. has been unusually fortunate in having as president the son of R. M. Rowland, personally recommended by W. Miller & Company, to fill the post in place of manager Russell M. Rowland, who had years of experience in the management of numerous breeding nurseries, replacement nurseries and has spent most time in the experimental variety trials. At the close of the war, he was in charge of Oregon State plant of the Curtis Acetylene & Motor Co. Inc.

Repetition Leads to Workman Proficiency

Talbot and Clark in the construction of airplane components. In this, there is perhaps no other industry in which the methods of manufacture are of such great importance to the worker. In addition to speed, cost, standardization of parts, lighter standards, increased speed and such other factors, the advantages of the job are that there are others which are of particular value to the airplane personnel. By the constant repetition of the operations, workers develop in the same sequence, the workers become more and more proficient, and greater consideration is given to detail. "Where ever, the very quantity of the parts to be made makes it possible to give more to each man so that even greater is effected and more delay will be applied when the work is completed. The high standards are maintained with the few workers. The fact that they are automatically depend upon the performance of the plant."

The best airplane in the world can feel its way satisfactorily if it is not satisfactorily served. The Panhandle Aviation Museum

[illegible]

To find this degree of fit, we calculate the χ^2 statistic



First, consider each of the new Mustangs that carry official Army numbers.

The understructure is of simple though sturdy design, giving a maximum of resistance and rock absorbents to all parts. Each wheel is supported, independent of the other by a fitted trans arrangement. The vertical compression

Weather shoes the wheels is divided and provided with shock absorbers on each side of the wheel. The shock absorber is out of the steel Kapsobon also constructed but of rubber discs separated by metal plates. Suspendable brakes are used, operated by foot pedals in the cockpit. The tires are 54 in. by 12 in. Goodrich Coats. The tail skid is swiveling and is supported by two members from the sides of the fuselage.



Due to a gear ratio of two to one the propeller must be

September 12, 1927

The specifications for the Keystone XL-1 right loader are:	
Spun	55 ft
Length	50 ft 4 in
Weight	150,000 lb
Capacity	150 cu yd
Stowage	150 cu yd
Dimensions (bank setting)	150 ft
Wing section	Chen-Yu
Weight	6070 lb
Capacity	800 lb
Fuel (54 gal)	2623 lb
Weight	635 lb
Wright loaded (with approximately 2750 lb of load)	5000 lb
Capacity	150 cu yd
High speed	150 cu yd
Loading speed	150 cu yd
High speed	150 cu yd

The two fleets attacked the former world record for close



The F3A-30 has a wing spread of 71 ft. and is powered with one 600 hp. Packard engine. Its Aug. 30 flight was the 29th annual flight made over San Diego since 1913, 90 years having been constructed since 1922.

which is fixed with a hardened steel shaft, bearing directly on a hardened bracket, whose axial fixed bush bearing on the crankcase.

The single three crankshaft is built up from hardened and tempered 40 in. axle diameter steel shavings. The crank arms have been drilled out and the balance masses pulsed out in order to obtain the minimum effort for the minimum gross weight. Two main roller bearings, located symmetrically behind each crank web carry the complete shaft. There is a special shaft double purpose spherical roller bearing at the propeller end, and a small white metal steady bearing at the tail end. The shaft is drilled throughout for lubrication, communicating holes and blanking plugs, allowing the receding chambers to be utilized for oil circulation and distribution.

A two row, large diameter, four lobed cam runs concentric with the crankshaft from end to end, it drives from it by a secondary gear-like gearing at $\frac{1}{2}$ engine speed in an anti-slash direction. This cam operates the overhead valves gear by means of tappets and pushrods.

The valves are in a specially designed Bristol Triplex Carburetor. It consists of three variable jet type carburetors forced in one casting and operated from one set of controls. It is mounted low enough to allow gravity feed and jet cone within the cooling.

The crankcase is divided into two main portions. The front and rear portions are of ribbed section, machined from aluminum castings. There are nine bolts making a close joint on the center line of the cylinders. These bolts are also used for attaching the engine to its mounting.

Japetus engines are now being used all over the world, for exhibition in their production at Fribourg, Britain, England, then are being manufactured and fitted to various aircraft, notably in France by the Société des Moteurs Gnome et Rhône, in Czechoslovakia on the well known firm of Walter A. Reak, in Italy in the works of the Alfa Romeo Co. under terms of a license held by the Italian Government, and in Japan by the Nakajima Co.

It is claimed that during 1936 more Japetus engines were produced and put into service in Europe than any other type. The manufacturer's specifications of the Bristol Japetus are:

Type **Standard** 1000 cc. 9 cylinder standard model

Run and stroke **Standard** 1000 cc. 9 cylinder standard model
Displacement **Standard** 1000 cc. 9 cylinder standard model
Engine speed normal **Standard** 1750 rpm
Engine speed maximum **Standard** 1875 rpm
Propeller **Standard** 1000 cc. 9 cylinder standard model
Cylinder **Standard** 1000 cc. 9 cylinder standard model
Mixture control **Standard** 1000 cc. 9 cylinder standard model
Oil system **Standard** 1000 cc. 9 cylinder standard model
Oil pump **Standard** 1000 cc. 9 cylinder standard model
Throttle control **Standard** 1000 cc. 9 cylinder standard model
Fuel **Standard** 1000 cc. 9 cylinder standard model
Weight dry **Standard** 1000 cc. 9 cylinder standard model

Power:
Standard commercial **Standard** 1000 cc. 9 cylinder standard model
Standard service **Standard** 1000 cc. 9 cylinder standard model
High compression service **Standard** 1000 cc. 9 cylinder standard model
at 2,000 ft. with standard fuel **Standard** 1000 cc. 9 cylinder standard model
at ground with extra boost **Standard** 1000 cc. 9 cylinder standard model

Compression ratio:
Standard commercial **Standard** 1000 cc. 9 cylinder standard model
Standard service **Standard** 1000 cc. 9 cylinder standard model
High compression service **Standard** 1000 cc. 9 cylinder standard model

Ignition:
Standard commercial **Standard** 1000 cc. 9 cylinder standard model
Dual 2 B.T.H. magnet, type 9

Fuel consumption:
Service type **Standard** 1000 cc. 9 cylinder standard model
maximum **Standard** 1000 cc. 9 cylinder standard model
minimum **Standard** 1000 cc. 9 cylinder standard model

Consumption type:
maximum **Standard** 1000 cc. 9 cylinder standard model
minimum **Standard** 1000 cc. 9 cylinder standard model

Oil consumption, all types **Standard** 1000 cc. 9 cylinder standard model
maximum **Standard** 1000 cc. 9 cylinder standard model
minimum **Standard** 1000 cc. 9 cylinder standard model

THREE GREAT CURTISS MILITARY AEROPLANES



"HAWK" Standard Pursuit type of the U. S. Army Air Corps

"FALCON" Standard Observation and Attack type of the U. S. Army Air Corps.

And now —

"CONDOR" The latest development in bombing aeroplanes for the Air Corps. Developed under the Curtiss system of Group Engineering, in cooperation with Air Corps experts, and already credited, in preliminary tests, with a performance far surpassing standard types.

THE CURTISS AEROPLANE & MOTOR CO., Inc.

Offices: Garden City, N. Y.

Factories: Garden City and Buffalo, N. Y.



New Automatic Airport Lighting Device

The successful automatic lighting of an airport was recently demonstrated at Delta Field, Montgomery, Ala., where the lens of the system is 30 ft. and weighs 1,800 lb. when in the field, which is on a lot of 1 ft. lights. The semi-automatic system which automatically shows the landing signal runs on a double set of 1 ft. lenses, mounted on a set of the Westinghouse Electric and Manufacturing Co.

Each of the four lenses of a microphone, mounted on a double set of 1 ft. lenses, is mounted on a set of 1 ft. lenses, which is mounted in a vertical position in order that it will not catch much noise from the air above. The current then induced

into it horizontally, or tilted vertically two degrees above and one degree below the horizontal. It is shut and sent back.

When equipped with a 2,500 watt generator lamp and a 100 ft. lens, the lens can be mounted on a set of 1 ft. lenses, which is mounted in a vertical position in order that it will not catch much noise from the air above. The current then induced

The Trans-Atlantic Fanner "Bluebird"

For some time Leon Green, pilot, and Pierre Cote, chief pilot, have been preparing their great Fanner airplane for a trans-Atlantic flight. From day to day reports have been received that they are ready to take off. May 25, when the weather has cleared, they will try to fly their great plane over to day. The Blue Bird is a Fanner airplane, a 15 ft. two 200 hp. 12 cylinder Fanner engine, in tandem with a propeller wing. These engines have a cylinder bore with a ratio of two to one.

With normal loading the Blue Bird has a high speed of 125 mph. It has a range of 4,000 mi. at a speed of 50 mph. It has the engine in tandem flight with one engine in a position without an effect from making an attempt to climb on the controls.

The general specifications are as follows:

Span	100 ft.
Length	50 ft.
Height	18 ft.
Area	1,800 sq. ft.
Weight	2,500 lb.
Weight	2,500 lb.

Army Circular on Engine Cleaning Fluids

The Army Air Corps is an endeavor to obtain a cheap, satisfactory solvent for cleaning engine parts, performed a series of tests to determine the minimum proportions of carbon tetrachloride required to produce a satisfactory cleaning fluid for the use in cleaning engines. The results of these tests were published in Air Corps Information Circular No. 300 entitled "Cleaning Fluids for Engines." This circular, published by the Chief of Air Corps, Washington, D. C.

It was concluded that the minimum proportions of carbon tetrachloride are as follows:

- Two parts by volume motor grade gasoline and one part carbon tetrachloride.
- Four parts by volume aviation grade gasoline three parts carbon tetrachloride.
- Two parts by volume of light kerosene of half barrel and half motor oil, three parts carbon tetrachloride.
- The rest of (a) in which two and one half parts of gasoline or 45 per cent. of the rest of carbon tetrachloride.

Shear in Plywood Webs of Box Spars

As Air Corps Information Circular on the "Shear Strength of Plywood Webs of Box Spars" has been published by the Chief of Air Corps, Washington, D. C., Report No. 207 contains a study of the results obtained from a series of tests by the Curtiss Aeroplane and Motor Co., which were performed by the Army and a result of these tests was established that will give the allowable shear strength for the plywood webs of a box beam for different beam depths and different spacings, when the ply web is two ply or three ply. It was concluded that the use of small or large or diagonals increases the efficiency of the ply web and will provide the use of three or four. The external diagonals or stiffeners arranged in two or three rows in a box beam will be found to be of great value. It is believed that the internal ribs are nearly most of the load and reaction points contribute to the shear strength at the beam.



THIS MARK

Half the parts...

SIMPLICITY and reliability go together in aircraft engines. The Fairchild Caminez Engine is simple almost beyond belief. It has less than half the number of parts of other engines... has no timing gears or counterweights... no bearings depending on lubrication pressures... and yet has the highly efficient half speed propeller without the use of reduction gears. Ralph Lockwood, of the U. S. Department of Commerce, pilot of the Curtis Flying Service, Army and Navy pilots, pilots of the Air Mail, Mr. Bruker, manufacturer of West planes, in fact everyone, who flew and inspected the Fairchild Caminez Engine, was amazed at its simplicity. This simplicity, combined with Fairchild Caminez refinement in design and manufacturing methods, will go a long way toward establishing new records for reliability and ease of maintenance. The manufacturer of your present plane can supply you with a Fairchild Caminez motor installation.

The Fairchild Caminez Engine Corp. is a subsidiary of the FAIRCHILD AVIATION CORP. Its products, like all Fairchild Aviation products, are thoroughly engineered and tested, efficiently manufactured and are backed with a service that



has made Fairchild Aviation one of the right largest organizations in the aviation industry.

Fairchild Caminez Engines were flown in April, 1926, and since then have been thru a strenuous series of flight tests and endurance runs, so there could be no question of their reliability. In July, 1927, a Model 407 B Fairchild Caminez Engine passed its 50-hour test, running the last 27 hours non-stop. As a result of the test it was approved as airworthy by the U. S. Department of Commerce, the first engine to be approved. Production engines are now being delivered. Fairchild Caminez Engine Corporation, Factory and Sales Office, Farmingdale, L. I., N. Y.

FAIRCHILD CAMINEZ

PRICE **2480** F. O. B.

This trade mark is a registered trademark of the Fairchild Aviation Corporation. It is used here to identify the product and is not to be used by anyone else without the written consent of the Fairchild Aviation Corporation.



Left to right: Y. Green, J. B. Zola, Chief Pilot and Mike Moore, standing next to the Bluebird aircraft.

In the microphone current is transmitted to a resonant circuit tuned to the frequency of the lens of the motor, which not only amplifies it, but also transmits all currents which might be induced by other sources such as radio, automobile horns, etc. Further increase that the device will only be affected by the motor lens is provided by the time constant of the lens which is so adjusted as to be unaffected by the sound but permit for an increase period of 18 seconds. This prevents the functioning of the apparatus through the induction of spurious signals, even though they have the same frequency as the sound signal. The actual timing of the circuit is adjusted by condenser.

Development of the Worthington Company

The flashlight installed at Delta Field is a new type of support projector developed by the Worthington Company. They are designed to furnish sufficient illumination over an area of 10 ft. in the same time having the same of light but not consuming appreciable parts in the use of the device. Each projector consists essentially of a ring from 10 in. in diameter and 18 in. deep, mounted on a 1/2 in. pipe standard.

Mounted within the frame are a lamp socket with normal, lateral and in-and-out focusing adjustments, a 10 in. galvanized metal reflector of about 10 in. length that is reflected into a cone approximately within a three degree cone, and a system of levers to adjust all the above of about 1/2 in. the upward 1/2 in. which extends 1/2 in. deep. A special lens mounted in front of the shell gives a horizontal spread of 45 deg. in the beam.

The unit is mounted on the pipe standard that it may be



*That's why
More Pilots fly them!*

THE remarkable performance of the Fairchild Monoplane, either as a landplane or seaplane, is the result of sound aeronautical engineering, excellent construction, and the Wright "Whirlwind" Engine.

Embodying the modern features of unstarred, heated and ventilated cabins, these luxurious planes combine complete comfort for

the passenger and pilot with all the "dash," speed, climb and safety that aeronautical skill has yet evolved.

The record of Wright "Whirlwind" Engine durability, reliability and safety in private flying is just as outstanding as those made in several recent overseas flights, and in over 4,635,000 miles of military and commercial flying during 1926.

Sent for Bulletin No. 178.

WRIGHT AERONAUTICAL CORPORATION, Dayton, N. J., U. S. A.

WRIGHT
Whirlwind
engine
A SUPERIOR AERONAUTICAL



Where contacts must not fail

THE Fairchild Aerial Camera with a speed of 1115 ft. of a ground used by the U. S. Army, U. S. Navy, Canadian, and Brazilian Air Services operated perfectly at a temperature of 61° below zero, when Capt. Stevens and Lieut. Macready made a world's record for altitude photography at 32,000 feet. Dr. Alexander Rice reported equal satisfaction during his Amazon expedition, in spite of terrific heat.

The camera contains 54 Baker Contact Points and never has the slightest trouble occurred with them. Should these little stress-contra-stress "temperature" a costly expedition might easily fail, but Baker Contacts have shown in such weakness and they prove equally reliable in other mechanisms requiring just as consistent performance.

BAKER & CO., INC.
54 Avenue St., New York, N. Y.
New York Chicago
San Francisco

Caspar Aviation Oil



THE DESIGNER

The FAIRCHILD CAMINEZ Radial Aircraft Engine

Significant Proof

"WE have recently submitted your Caspar Aviation Oil to a 90 hour non-stop endurance test in our Model 447-B aircraft engine. We decided on the use of this oil for this test because preliminary tests showed this oil to be very satisfactory for our aircooled engine. . . . We feel that the fifty hour test just completed gave a better proof of the suitability of this oil for flight purposes."



Examination from left
are allowed in
Caspar Oil Corporation
by Mr. Harold
Common, Chief
Engineer. Dated
June 21st 1927

Model 447-B Fair-
child Caminez Air
craft Engine
powered in W.A.C.O.
Plane

THE ENGINE and — THE OIL

"CASPAR increases your Factor of Safety"



September 12, 1927

AVIATION

607

Three times the life!

This Wright Whirlwind Engine, built by Wright Aeronautical Corporation of Paterson, N. J., establishes fine record of **316 flying hours** using

CASPAR AVIATION OIL
"Three times the life!"

The choice of CASPAR OIL by Pioneer Instrument Company, and its **superior performance** under various operating conditions justifies all our claims . . .

CASPAR

"The Precision Oil"



Travel Air Plane NC-51 of Pioneer Instrument Company with Wright J-4 Whirlwind Engine. Inset: Geo. Wein, chief pilot

CASPAR OIL CORPORATION

Aviation Division

1619 BROADWAY

NEW YORK CITY

Magnalite Castings and Fairchild products

THE FAIRCHILD Aerial Camera Corporation have used MAGNALITE heat treated aluminum alloy castings in their famous cameras from the first. MAGNALITE castings are used exclusively in the newest Fairchild Aerial cameras, Models K-3 and K-8.

MAGNALITE castings are now used in other Fairchild products. Below is a representative but not complete list of castings

Cameron Engine

Pistons, breathers (front and rear), valve tappet guides, oil pump housings for scavenging and pressure pump, drive shaft bushings in rear, tachometer drive housing, magneto advance lever, magneto advance yoke, and miscellaneous small castings.

Aerial Camera

MAGNALITE castings exclusively in the latest Fairchild cameras, Models K-3 and K-8, including main case, main drive case, shutter case, shutter case housing and other castings.

Cabin Monoplane

Miscellaneous small aluminum alloy castings.



The Fairchild Cameron Engine

MAGNALITE heat treated aluminum alloy castings have been used for over 23 years by the automotive industry and by the aircraft industry since its beginning. Heat treated, high tensile strength, aluminum alloy castings a specialty. Permanent mould, sand, and die castings. Our engineers can help you with your problem.

WALKER M. LEVETT COMPANY
Established 1904
445-421 East 32nd Street, New York City

MAGNALITE HEAT TREATED CASTINGS

TRUSCON HANGARS



TRUSCON HANGAR USED BY THE FAIRCHILD AIRPLANE MFG. CORP.



TRUSCON BUILDING USED FOR PRESENTATION AND OFFICES



TRUSCON BUILDING USED FOR GARAGE AND FUEL STORAGE



TRUSCON HANGAR WITH LEANTO FOR MACHINE SHOP

Truscon Airplane Hangars are permanent and fireproof. They are assembled from standardized units which can be combined into buildings of any desired length and width. Being laid out in clear spans, their unobstructed floor space assures utmost freedom in moving and handling the planes. LARGE SLIDING DOORS easily operated and opening the full width of the building, simplify and speed the storing of planes. COMPLETE BUILDINGS for all airport requirements and for every need of the Airplane Industry.

TRUSCON STEEL COMPANY
TOLSON, GEORGE, CHIEF
ESTABLISHED 1901
Manufacturers and Engineers
PLANNING OFFICES IN PRINCIPAL CITIES



TOWER

One best way...

TO DO EVERYTHING...no other organization spends as much in research and testing as Fairchild to find that one best way... The results of 7 and doggedly sticking to the policy of being satisfied with nothing less than the best has won for Fairchild Aviation position of leadership in each field it has entered. This policy has produced results which are of definite value to purchaser of every Fairchild Aviation product and to every dealer who represents Fairchild.

FAIRCHILD AVIATION PRODUCTS are built to definite standards and are absolutely made made of the flying home "Tugues." Fairchild who mean that not only have high grade materials been used, but the right material for each purpose has been selected, tested metallurgically and tested in our own laboratory to see that up to specification. They mean that every product must be simple of the latest and most progressive engineering... every that has only one standard... perfection.

Fairchild standards mean the purchaser receives more real value for his dollar in a Fairchild product. They are manufactured in modern factories with the production machinery and sold at a fair profit. Important parts and manufacturing economies result from the sheer volume of it. And above all... service standards mean that the product has sought from an organization which is just as much interested in the service after the sale as before. Fairchild rarely loses a repeat order; the service as well as the product is responsible.

Some Fairchild products bought by organizations with every facility for analyzing and from the majority of Fairchild products are bought by people with lines or facilities far not, bought on the belief that if it is a Fairchild product it is built of the best materials, the last word in progressive engineering and fine work-

manship and that there is no interpretation of the word service that will not be carried out to a letter.

The Fairchild Aviation Corporation was formed to organize, acquire, finance, and manage subsidiaries in both the manufacturing and operating fields of the aviation industry. Each subsidiary corporation is complete in itself with its own administrative, production and sales departments. Yet each one profits from the reputation, financial strength and backing of the parent organization. The Fairchild Aviation type of organization is unique in the aviation industry. The opportunities for advanced engineering, economies of mass purchasing and manufacturing, mass sales and distribution resulting from this type of organization are evident and have been amply demonstrated by the largest organization in the automobile industry.

Today, Fairchild Aviation controls Fairchild Aerial Camera Corp., manufacturers of precision aerospace aerial mapping cameras, Fairchild Aerial Surveys, Inc., pioneer and largest producers of aerial maps, Fairchild Airplane Mfg. Corporation, manufacturers of airplanes, pontoons and flying boats, Fairchild Gasoline Engine Corporation, manufacturers of an improved type of alcohol airplane engine, Fairchild Flying Corp., local operators of airplanes for photographic and test work, and in Canada, Fairchild Avionics Ltd., general agents for Fairchild products, operators of aircraft for mail and photographic work, and in Mexico, its associated company, Compañia Mexicana de Avionics.

FAIRCHILD





New Ideas for Milling Aeroengine Parts . . .

THE above photograph shows a view of our Service Department where we are continually suggesting new methods and new ideas to a large number of manufacturers producing aeroengine parts. Cincinnati Millers will be found cutting costs and increasing profits in practically every plant connected with the building of aeroengine parts. We are in the ex-

ceptional position of being able to offer high production machines not only in the knee and column type, but in the fixed bed or manufacturing type as well. If you send us full and complete information with regard to your milling jobs, we will be glad to give you the benefit of our ideas with no cost or obligation to you.

THE CINCINNATI MILLING MACHINE COMPANY
CINCINNATI, OHIO

CINCINNATI MILLERS

The Caminez Cam Engine

is equipped with

SCINTILLA

Aircraft Magnetos

SCINTILLA MAGNETO COMPANY, INC., SIDNEY, N. Y.

Contractors to the U. S. Army and Navy

THERE IS ONE BEST AERIAL CAMERA

FOR the past eight years, the FAIRCHILD AERIAL CAMERA CORPORATION has enjoyed the confidence of the world's best authorities in the design and manufacture of MILITARY AERIAL CAMERAS. The only way to determine the merits and value of any apparatus is to run up the equipment and test it under the most severe conditions.

THE UNITED STATES GOVERNMENT AIR CORPS and the ROYAL CANADIAN AIR FORCE have probably done more military testing than the rest of all other governments combined. These governments with their extensive testing programs have naturally been making studies in selecting the best and most reliable camera apparatus, and we are proud to say that FAIRCHILD MILITARY AERIAL CAMERAS are still used EXCLUSIVELY in large quantities by these governments after approximately eight years of service, operating under the most severe conditions—nearly a record to be proud of.

These governments have proven the extreme value of Aerial Surveys. Other governments are now making the important tests of Aerial

Surveys. It is a pleasure to give you the advantage of an experience. The Company's interest does not cease with the sale of an apparatus—it's value begins.

The experience we have acquired by close cooperation and intensive interest with the FAIRCHILD AERIAL SURVEYING, INC., makes it possible to render a special service to our clients in the best application of our apparatus.

The Corporation has been identified with aerial photographic apparatus and the making of aerial maps of all kinds and for every purpose for many years.

In cooperation with the UNITED STATES GOVERNMENT it has developed and produced what is now considered as the world's finest product in the field. The Corporation's apparatus and personnel are placed in a command development of aerial photographic apparatus of the highest grade for land, sea, and air photography. Our Engineering Staff, trained in all branches of Aerial Photography, is at your service at all times for information and help.

FAIRCHILD AERIAL CAMERA CORPORATION
270 West 38th Street New York City

ECLIPSE

AVIATION ENGINE STARTERS



ECLIPSE STARTERS are recommended by the Fairchild Aviation Corporation for use on the Fairchild-Caminet Cam Engine.

ECLIPSE MACHINE COMPANY
EAST ORANGE PLANT
East Orange, New Jersey
Elmhurst, New York Walkersville, Ontario

Illustration of Hand Starting System
installed on Fairchild Caminet
Cam Engine.



18 in. 22" x 12"
Fairchild - Caminet Engine Co.



40 in. 24" x 12" Union Hardware Co.

*Work simply can't be spoiled
in these
"American" electric furnaces*



Battery of Pot Furnaces
Ford & Whitney Co.

The positive automatic temperature control, the speed, safety and economy of operation, and the superiority of work produced, make them practically indispensable.

*An inquiry will speed the facts along to you
as soon, and only when information you may wish.*

American Metallurgical Corporation
27 Van Hilsen Street, Boston, Massachusetts

The Landing Gears on the Fairchild Cabin Monoplanes

are being designed and constructed by our organization.

We maintain a well equipped factory and a competent personnel for the design and manufacture of all kinds of airplane parts.

Our machine work is one of our specialties.

KIRKHAM PRODUCTS CORPORATION

Garden City, Long Island

For Flying Photographers

BAUSCH AND LOMB lenses, magazine glasses and other camera parts of an optical camera easily meet the rigid requirements of aerial photography. An impressive endorsement of these products comes from the Fairchild Aerial Camera Corporation. They say, "Magazine Glasses must be of the highest grade glass obtainable and must be optically perfect. Tolerances are held plus or minus .1, and we reject same for any bubbles or stress found." It speaks volumes for the accuracy of Bausch & Lomb products in that we have never yet had a complaint on any glasses or screws. Other products supplied to the firm by Bausch & Lomb are: lenses, contact glasses, vertical and negative viewfinders and mirrors for stereoscopes.

BAUSCH & LOMB OPTICAL COMPANY

635 St. Paul Street

Rochester, New York

Manufacturers of

Kinostones, Searchlight Mirrors, Metallurgical Apparatus, Microscopes and other optical instruments

UPHOLSTERY for Aircraft



Upholstery in the Fairchild Cabin Monoplanes.

FOR 25 YEARS we have been Specialist Upholsterers for the Yacht and Marine Trade, and while such upholstery has always been made with a view of being the most comfortable cushions to sleep and sit on, we have also had in mind that such cushions must be life preservers in case of emergency.

Analyses regarding a similar type of upholstery has come to us for its requirements in this line, and evidence to us we have had that we have a national reputation, our cushions having been used in the principal planes that made the records in the Trans-Atlantic and Trans-Pacific flights.

We select superior from the trade, and cushions will be cheerfully furnished on all types of cushions including Rubber Air Seals.

ATLANTIC PACIFIC MFG. CORP. 124-126 Atlantic Ave. through to 125-125 Pacific St., Brooklyn, N. Y.



Trouble-proof Aluminum Tanks

ON

ALL FAIRCHILD PLANES

Paramount chemical treatment process absolutely prevents corrosion around welded joints.

Fuel load is increased because aluminum and dural tanks only weigh a pound for each 2 1/2 gallons of capacity.

Piston, conds, and general sheet metal work in all materials.

PARAMOUNT

WELDED ALUMINUM
PRODUCTS CORP.

48-52 South 8th St.
Brooklyn, New York

FAIRCHILD

Cabin Monoplanes
are equipped with
the



**BOYCE
MOTO METER**
to indicate oil and water
temperatures



The MOTO METER CO., Inc.
4 Wilbur Avenue
Long Island City, New York
Chicago Office: 820 Tower Court

SUMMERILL Seamless Steel Tubing

is used by

FAIRCHILD

and other leading
aircraft builders

Furnished in Specification to

STRAIGHT CARBON
NICKEL STEEL
CHROME MOLYBDENUM
ROUND, STREAMLINE, ETC.

Available in Aircraft Tubing—Manufacturers for All Sizes

SUMMERILL TUBING COMPANY
BRIDGEPORT HONOLULU CO. (Philadelphia, Denver) PA.

PERRY-AUSTEN

DOPE

used throughout on all

FAIRCHILD
AIRPLANE MFG. CORP.
PLANES

Perry-Austen Mfg. Co.
Staten Island, N. Y.

Contractors to United States Government

PRYBIL The Famous Prybil No. 10 Circular Saw

BALL BEARING &
SELF CONTAINED MOTOR DRIVE



Tilting and Rotating Table

A PRODUCTION MACHINE
FOR PRECISION WORK

P. PRYBIL MACHINE CO.
512-516 West 43rd St., N. Y. C.

FAIRCHILD

uses

Raymond Springs



Your product demands dependable
springs. Let us estimate on your
requirements.

All Metals — Any Quantity

Raymond Mfg. Co.
Corry, Pa.

FAIRCHILD

uses

PIONEER INSTRUMENTS

Write
for
Bulletins

PIONEER INSTRUMENT COMPANY
754 LEXINGTON AVE. BROOKLYN NEW YORK

WE are particularly proud that the Fairchild organization has found our service satisfactory in every respect.

Practically every well known manufacturer of aircraft and engines is supplied with materials by our company. Our long experience and large stocks enable us to meet the requirements of the aircraft industry quickly and at the lowest cost.

Aero Supply Manufacturing Co., Inc.
Manufacturers and Distributors of

Aircraft, Aero Motors,
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College Point, Long Island, N. Y.

OUR CREED
"Make It Safe for the Flyers"

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Connecticut Broaches are made for use on all makes of branching machines and for all classes of work.

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Everything an AIRPLANE can offer...

Is combined in the Fairchild "All Purpose" Monoplane. Built in as fine a way as a seven-year organization knows how to build, and sold at a price only possible because of two-week volume, the Fairchild Monoplane is without question the outstanding value in the fine plane field.

HERE is a plane that really flies itself to such an extent that Curtis Flying Service pilots do not hesitate to get out of the plane's compartment for long periods. Here is a plane that has ample, and at the same time, light control even beyond the stalling angle, partly the result of small scientifically designed tapered airfoam combined with a high aspect ratio rocker.

These unusual flying qualities were not achieved by chance, but by a year's wind tunnel and flight testing and the determination of the Fairchild engineering staff to build the first plane in the world.

Here is safety assured by a complete stress analysis, the physical testing of all major parts and a most important system. Safety is one result of the thoroughness of Fairchild Engineering. Here is workmanship and finish comparable in production airplanes, workmanship obtained only by a large organization which can specialize in each operation.

Unsurpassed advanced and tested refinements make the "All Purpose" Monoplane the best used in fine planes, refinements which add to the performance, range of use, and ease of maintenance.

The most important refinements are: Wings, which can be easily folded in two sections by one man; three wide doors for easy entrance; exceptionally large safety glass windows; comfortable seats which quickly fold out of the way for freight carrying or

photography; adjustable pilot's seat; seven brakes in dual disc wheels; an improved type of oleo and spring landing gear; and a vision which is more nearly 180° than that found in any other plane. From spencer to tail shaft there is ample evidence of the determination of an experienced engineering staff to build the best.

The organization back of the product is an important consideration in any purchase. Its reputation and stability is your only guarantee of the quality of the many parts of the plane which you cannot see or inspect, and of the service you will receive, not only today but years from now.

The Fairchild Airplane Manufacturing Corporation is a subsidiary of the FAIRCHILD AVIATION CORPORATION, one of the eight largest organizations in the aviation industry. As such, it is well managed, fully financed and progressive. For seven years Fairchild has been building quality aviation products, building and servicing them in what the name Fairchild is favorably known wherever aviation products are discussed.

Fairchild Airplane Manufacturing Corporation, Farmingdale, L. I., New York, has the Department of Consumer's Fairchild Monoplane on the Long Beach Tour, or at a local Fairchild agent, or fly into our factory—but in any event write for a complete catalog of this plane.

FAIRCHILD



Work in the Variable Density Wind Tunnel of the N.A.C.A.

By EASTMAN N. JACOBS

IT HAS now been about four years since the first preliminary tests were completed in the Variable Density Wind Tunnel of the National Advisory Committee for Aeronautics. A summary of the work which has been carried out since that time will be of interest to many who have not been so close touch with the activities at the Committee's laboratory at Langley Field, Va.

One of the principal reasons for the necessity of predicting accurately the performance of airplanes, or parts of airplanes such as the wings or fuselage, from tests on small models in the conventional type of wind tunnel, is that the air flow about the small model is not similar to that about the large object from which it was made. In other words, the distribution of the air flow about a body depends not only on the shape of the body but also on other factors as well. It has been shown theoretically that the type of flow depends on the size of the body, its velocity through the fluid, the viscosity of the fluid, and the density of the fluid. It has also been shown that, for any, changing the density has approximately the same effect as changing the size of the body, so that the

on a balance whose weight the air forces on the model. From this data coefficients of lift, drag and pitching moment are obtained, which are equal to the coefficients which would be obtained from tests at normal atmosphere density on a similar scaled body, thus as large. However, if the small model were tested in the conventional type of wind tunnel, or in the variable density wind tunnel at normal density, the results would differ from that about the large model. The coefficients, which depend on the configuration of the flow past the object, would also have different values. This change in the values of the coefficients with the equivalent size or scale of an object, is known as "scale effect." The scale of the



A recent view of the interior of Variable Density No. 2 Wind Tunnel

test is usually expressed by a number known as the Reynolds Number, which takes into account all factors which influence the scale. The Reynolds Number is a measure of the relative importance of the inert forces and viscous forces of a flow so that if two flows have the same Reynolds Number, the value of the same in viscous forces will be the same, the form similar, and the coefficients equal.

By varying the pressure in the tunnel the Reynolds Number of aerial tests may be varied from 200,000 to 4,000,000. The largest number corresponds to the twenty atmosphere tests and to the lower range of the values obtained in the flight of full scale airplanes. The coefficients given from the twenty atmosphere tests should therefore be used for most design work. Nevertheless, tests are often made with low pressures in the tunnel for comparison with the results from other tunnels, and also for determining the scale effect on a model.

While scale effect is of special interest, tests are usually made at a series of pressures so that the variation of the coefficients with Reynolds Number may be studied. In this way data may be obtained which may be used for interpreting the results of ordinary atmosphere tunnel tests by forming general rules for predicting scale effect so that the strong-streamlined tests may be intelligently converted to full scale conditions. For a more complete description of the theory, construction and operation of the variable density wind tunnel, the reader is referred to N.A.C.A. Report No. 225, by Mrs. M. B. and Elmer W. Miller.

It is only recently that designers have started to make use of the results of the twenty atmosphere tests in the variable

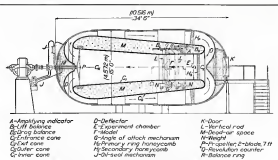


Fig. 1 Sectional Elevation of Variable-Density No. 2 Wind Tunnel

density wind tunnel. However, several successful airplanes have recently been designed using data from this tunnel. Among them are the Hispano and Tenthair biplanes, using the H-6 wing, and the Hispano monoplane using the H-10 tapered wing. The question has been raised many times whether the high scale tests in the variable density wind tunnel will be the design in other words, then the theory prove correct as practice? It is very difficult to derive an expression which gives direct comparison between the results of tests in the tunnel and the results of full scale tests in free air. Those experiments which have been made indicate that the theory proves correct in practice. For example, flight tests in England on two airplanes gave considerably different values of the moment lift coefficient than the values collected by the model tests made there in the ordinary type of wind tunnel. These models were later used in this country for the purpose of predicting tests on them in the variable density wind tunnel. These tests showed a large scale effect on maximum lift. The values from the twenty atmosphere tests were in much better agreement with the full scale results. All airplanes are thus, when available, the results from the twenty atmosphere tests in the variable density wind tunnel should be used for design work.

The tests during the first year of operation were mostly of a preliminary nature for testing the tunnel and for comparison with other wind tunnel and flight test data. Most of the year was spent in completing and making alterations in the tunnel. The investigation made during the fall of 1926, which marked the completion of the preliminary testing period, consisted of tests on a wooden model of the Fokker D-VII for comparison with flight tests on the same airplane, first for the drag of the fuselage and wings, and then surface friction tests on large plates. Also a series of tests of the N.A.C.A. wind tunnel standard wing models, which were previously tested by several other American wind tunnels, was conducted and tested in the tunnel over a wide range of Reynolds Numbers. These tests served to check the operation of the tunnel. A velocity survey was then taken and observations were made about the flow was considered satisfactory after which the program of aerial testing was started.

In September, 1926, three model airplanes, known as N.A.C.A. W, 58 and 59 were tested at several pressures. The

results of these tests may be found in N.A.C.A. Report No. 217, by Mrs. M. B. and Elmer W. Miller. A systematic series of twenty-four model airplanes were then tested. These airplanes were developed by Dr. Munk and are known as the M.A.D.A. M-1 to M-27. The engines were combinations of three degrees of thickness, camber, and S shape, and were all characterized by small scales of thickness, camber and low drag. The results of these tests, which were made of twenty atmosphere tests only, may be found in N.A.C.A. Report No. 221, by Mrs. M. B. and Elmer W. Miller. For comparison with the results



A Sperry Monoplane model.

obtained from other tunnels and also to study scale effect, several commonly used aerial sections were tested over a large range of Reynolds Numbers. These sections include the D.A.P. 25, Goettinger 307, D.A.P. 4, D.A.P. 17, D.A.P. 306, D.A.P. 308, and the Clark Y. An interesting comparison between these airfoils and also one of the better ones from the series of twenty-four airfoils, may be found in N.A.C.A. Technical Note No. 218, by G. J. Higgins. A large report No. 223 also covers these tests. This series of tests should be of special interest to the designer who is studying an airfoil section, because the characteristics obtained from tests at the higher Reynolds Number may differ considerably from

Folder D-2 model in experiment system with data obtained in the laboratory.

flow about a small body in dense air is similar to that about a smaller body body in air of normal density. It is on this principle that the design of the variable density wind tunnel is based.

The tunnel is enclosed within a steel shell, so that the density of the air inside may be increased by pumping air into the shell to a pressure of 200 lb per sq. in. A 250 hp motor, driving a compressor, compresses the air, drawing it through the free-flow test section at a velocity of about fifty miles per hour. The model is mounted in the throat of the tunnel

The New Air-King Model 27

Light Commercial Four Place Plane Powered With an OX5 and Having A Better Climb and a Lower Landing Speed Than Previous Model

A RECENT addition to the light commercial planes of the year has been made by the Consolidated Aircraft Division of Leominster, Mass., manufacturers of the "Air-King" three or four place biplane. The new model, Model 27, is claimed to be a vast improvement over the previous model. As reported, new under carriage of the split axle type has been substituted, and the dampers, structure for the tail surfaces has been replaced by one of steel. The span has been slightly increased, making the landing speed down to 35 m.p.h. By lowering the stage to 18 in the range of vision has been increased. Compared with an OX5 the performance is much better than that of the previous Air-King, having a better climb and a lower landing speed. When equipped, model 27 can be powered by either a Pratt & Whitney Whirlwind or an additional engine.

The fuselage retains the same as in the previous Air-King. It is of the Warren truss type construction built up entirely of steel tubing welded at the joints. All tubing is reinforced inside and out to prevent corrosion. The covering is doped fabric.

The cockpit is finished with leather and provided with full width windshield. Though these people are preferable the plane has been designed to accommodate two, two in each cockpit.

The engine is mounted on a welded steel tube frame. It is of rigid construction yet simple enough to facilitate maintenance and have the engine easily accessible. The fuel tank is provided with a spongy filling into the streamlines of the engine cowling down an oval side of the engine offer easy access to the carburetor and other parts.

Tubular Honeycomb Bahuter

A tubular honeycomb bahuter is used. As it is mounted laterally just below the upper wing it does not interfere with the pilot's vision. The upper and lower wings of each side are interchangeable. Upper box, lower wings and upper and lower are used. The ribs are placed one ridge apart near the fuselage and slightly farther apart toward the wing tips. Landing and landing ribs are strengthened by spring strips. The wing tip is protected by a sloped steel tube. The side wing structure is protected by two strips of varnish. Three sets of clear dope and three of pigmented dope are used in finishing the fabric covering.

The tailplane struts are of steel tubing, streamlined with bakelite wood. These struts, which replace those of duralumin, are of the N type, eliminating all resistance to bending.

The upper and lower struts on each side, like those on the previous Air-King, are placed independent of each other. The manufacturers state this feature being that it does not affect the loading of the plane and that complete control is possible with either the rudders or left rudder. This gives an all round degree of safety. Windows are provided a back lower wings to permit operation of the various controls without removing the hands. The horizontal stabilizer is adjustable by moving a lever located on the fuselage. The lever is mounted just behind the right of the cockpit near the door, out



The new Air-King model 27, a light commercial four place plane.

of the way to avoid landing with the parachute harness on safety belt.

The undercarriage is of the split axle type with rubber shock absorber and is torsion. The main gear is easily to be placed without any special or complicated wiring. The structural members of the landing gear are of steel tubing fitted with tubes. The wheels are streamlined with aluminum discs.

The manufacturer's specifications for the model 27 include: Span, upper wing 31 ft. 3 in. Span, lower wing 34 ft. 2 in. Chord, upper and lower 10 ft. 6 in. Sweep, positive 16 in. Sweep, back 9 in. Chord, lower wing 31 ft. 3 in. Sweep, negative 16 in. Wing span, total 65 ft. 5 in. Airfoil section Clark Y. Weight, empty 2,000 lb. Weight, loaded 3,000 lb. Wing loading 50 lb. per sq. ft. Speed, maximum 80 m.p.h. Speed, cruising 60 m.p.h. Speed, maximum 30 m.p.h. Useful load 1,000 lb. Fuel capacity 25 gal. Fuel consumption 200 gal. Fuel tank capacity 200 gal. Climb initial 800 ft. per min. Service ceiling 15,000 ft.

Aircraft Exports in First Half 1937

The value of the total exports of aircraft, parts, and accessories, in the first half of the present year was \$221,683. These exports being divided as follows: 39 airplanes valued at \$111,620; 94 aircraft engines, valued at \$103,542; and miscellaneous parts, valued at \$7,521.

The most noticeable feature of these figures, as compared with those for the first half of 1936, is the fact that the average value per plane in the current year amounted to \$11,000 as against \$1,000 in 1936. The average value of planes amounting to \$4,707 per unit.



The Consolidated Courier !

A SPECIAL convertible type, using the Wright Whirlwind engine, designed to provide the following: complete dual control for training and practice flying, passenger carrying, seats of every sort, cross-country flyer (with remarkable ability to get in and out of small fields), gunner practice both fixed and flexible, observation mission with radio. These conditions may be had either as a biplane or as a single float monoplane. Cockpits are very roomy and comfortable, with a large baggage compartment. Controls and instruments in both cockpits are so arranged that either may be made quite clear for any desired purpose.

THE CONSOLIDATED COURIER is a proven, developed airplane. It is fast, very seaworthy and it embodies the same features which have enabled its predecessors, the CONSOLIDATED TRUSTY and CONSOLIDATED HUSKY, to build such an unexcelled record for safety and durability in long service by the Army Air Corps and the Naval Air Service in training operations. CONSOLIDATED TRUSTY, HUSKY and COURIER parts are practically all standard, making spare parts interchangeable.



The Consolidated Husky

Designed and constructed by

CONSOLIDATED AIRCRAFT CORPORATION
BUFFALO, NEW YORK

FOREIGN AERONAUTICAL NEWS NOTES

By Special Arrangement with the Automotive and Transportation Divisions,
Bureau of Foreign and Domestic Commerce

Prepares Three Continent Air Mail

The Republic of Uruguay has recently subscribed to a contract with an air transportation company, which probably before the end of the present year will inaugurate an air mail service between Uruguay, Brazil, Africa and Europe. According to preliminary reports the plans of the company provide for the establishment of an air mail service between 25 different places over a route which will have for its terminals the cities of Buenos Aires, Argentina, and Paris, France.

The first flying schedule is said to call for one forward and one outward trip a week and the duration of the journey between terminal points, it is estimated, will be 10 days.

The company proposing to operate the air mail service is known to have been some experimental flying along the route that will be followed in South America and in Canada with the airlines to be inaugurated. One pilot and six mechanics, of the Cie. General de Aviaciones Argentinas, Linhas Latamers, are recently reported to have arrived in Brazil, presumably for service in connection with the postal route.

The contract signed by the Executive Council of the Telegraph, Telephone and Postal Services in Uruguay and the company proposing to operate the air mail route is identical with the one signed last June by the Argentine Government and the same company.

Plan Lima-New York Flight

Efforts are being made to raise, by public subscription, a sum of \$1,500 for the first Peruvian pilot to make the flight between Lima and New York. "El Comercio," in supporting the movement vigorously and urging all interested in aviation to subscribe. Ricardo Gomez Corrojo, a young Peruvian pilot, states that if the above amount is subscribed he will spend a similar sum in purchasing an Alouette plane from England and that he will make the flight by way of Ecuador, Colombia, Central America, Mexico, Texas, Washington, and New York.

Air Mail Rotterdam to Port Said

A trial flight will be undertaken soon from Rotterdam to Port Said when the mail will be transmitted in a fast anti-air storm, according to plans recently announced by the Royal Dutch Airways Co. The steamer will be out at Seixun by plane, which will fly the mail to Rotterdam, Delft, Seixun, and to Rotterdam and Seixun, Java. It is believed that such a flight will demonstrate that mail can be received in Rotterdam, India, within two weeks of the time it is sent from Holland.

Bolivia Air Lines Show Progress

The Aero-Bolivia Company, of La Paz, Bolivia, reports that during the last fourteen months its planes made 354 flights, covering 45,360 miles, and flying 424 hr., 35 min. The planes carried 1,500 passengers, and 6,000 lb. of baggage. The planes of the company are at times forced to fly at a height of 15,000 ft., so many of the routes are over the Andes. The flight from Cochabamba to Santa Cruz necessitates a loss of 250 miles over the mountains. The planes make 2 hr. in 50, hr., occupied with two weeks by post mail, a fast method of travel.

Peru Shopping Service Popular

On the arrival at Cayuse regularly of the smaller afternoon Peru Shopping Service, it was noticed that the twelve passengers were all ladies. This is an indication of the increasing popularity of the Peru Shopping Service.

League of Nations Plans Air Service

The League of Nations is considering the establishment of an air service near the seat of the League in order to facilitate communications between the League and members of the Council at critical moments.

A committee of experts has been appointed to study the matter. They have examined the site of the Geneva airfield and have proposed to the Swiss Federal and Cantonal authorities several suggestions for improvement.

Romania Purchases Czechoslovakian Planes

The Czechoslovak airplane factory, Avia, announces that it has received from the Rumanian government an order for a number of planes of the B 11 25 model. The planes will be delivered during the present summer and will be put into operation on the Rumanian air lines. A plane of the type mentioned was exhibited at the Prague International Aeronautical Show, which was held early in June.

Luft Hansa Makes Agreement with Railroad

An agreement between the Luft Hansa and the German railroad system secures the delivery to flying fields of packages due an extra charge of 25 cents. From the fields, the planes of the Luft Hansa will then transport the freight to its destination, or to the nearest point reached by the air service, from which the railroad will make delivery.

Chilean Government Buys British Planes

The Chilean Government has recently placed an order with the Percival Aviation Company of London for a number of their latest model T15 P three-seater bombers furnished with Napier 450 hp. engines.

The machines to be furnished are very high speed 3-place bombers and are capable of being converted into seaplanes, by the addition of floats.

Danish Air Traffic Increases

Air routes leading to Copenhagen airport during the month of July, 1927, carried 1875 passengers, as against 1812 during the month of June, or an increase of about 300 passengers. Of the total number, 1506 passengers had their work as starting or leaving point, while the balance passed the port en route to other seaports.

During the month of July, 1927 airplanes called at the port, as compared with 518 planes called during the month of June.

Cherbourg-Bordeaux Air Mail Service

The establishment of air mail and express service from Cherbourg to Bordeaux via Nantes, has been projected, with the intention by the premium committee of 300,000 francs on bonds. At the close of the June quarter, it was reported that about three-fourths of the sum had been subscribed by members of commerce and business organizations. The operating company, the Societe Postale Aeronautique de l'Atlantique, is closely allied with the Aero-Club de l'Atlantique.

Restaurant Plans Between Paris and London

A "restaurant plane" has been placed in daily operation on the airline between Paris and London by the French airlines company, Air Union. A cold luncheon is served, including hot soup, potatoes, lobster, duck, veal, ham, salad, dessert, fruits and coffee, with wine, either or less. In the near future, an electric stove will be installed for preparing warm food. The plane carries a pilot, a radio operator, cook, waiter and two passengers and their baggage. It is one of the fastest planes in Europe, averaging 225 mi. in two hours.

Heenan Aircraft Repair Depot

HEENAN AIRPORT 5 Miles West of Town STREATOR, ILL.

Aircraft Repaired and Conditioned

to satisfy official inspection

In charge of Jerome Lederer

Formerly Aeronautical Engineer U. S. Air Mail Service with Staff, Late of Maywood Air Mail Regale Depot

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Seventeen to third in production
in six months . . . Why?

Turned out workmanship — Highest grade material — Unequalled performance.

FIG. 111 GROUP 11

AMERICAN EAGLE AIRCRAFT CORPORATION

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Hudley Field, N. J.

By J. E. Wieske
 Reynolds Airways, Inc., has leased hangar No. 2 and has also taken shed flying and student training permits on the field.
 Phoenix Airlines, Inc., and the Colonial Air Transport, Inc., will be quartered in hangar No. 3, which is now open.



Hangar at Hudley Field, New Brunswick, N. J.

fully equipped. A general service hangar is now under construction for the storage of privately owned and leased planes. Complete service and repair facilities with expert mechanics in attendance are available.

The new type flood light, using a 5-hp. incandescent lamp, and fitted with 180 deg. ground focused lens, is being installed at the east end of the field, which, together with the B.D.T. 130 type, air flood light, will give Hudley airport splendid lighting equipment.

Atlanta, Ga.

By John K. Okey Jr.
 Through the activity of the secretary of the Atlanta chapter of the N. A. A. and the progress of the president of these releases, operating in Georgia and Alabama, south pilots will be posted as to their whereabouts by air as every station of the road.

The signs which will be placed from Augusta, Ga. to Selma, Ala., will take the state of the town in eight day letters. Where an election current is available, as it is at every of the stations, the signs will be discarded.

Where there is a landing field nearby a direction arrow and the miles to the airport will be painted on the station marks in addition to the name of the town. Announcement of the agreement was made through Capt. Wiley Wright, secretary of the Atlanta chapter, by Charles A. Widenheim, president of the releases.

Clinton, Ohio.

Charles defeated his fence field recently in the presence of 7,000 persons. The great battle took place and the Army pilots joined with the civilian pilots in giving the city some fine demonstrations of flying. Plans evolved over the air in fact and address of volume were made by Mayor Ben McWhorter and Congressman Jim McMillen.

Brawley, Ohio.

An 80-acre tract has been selected and cleared and will be used as an airport at Brawley, Ohio. E. W. Westover of this city has announced. The out-and-out runway will be 1,000 ft. long and the north-south runway will be 1,200 ft. long. The field was promoted by the Brawley Chamber of Commerce. Brawley is about midway between Toledo and Oklahoma City.

Milwaukee, Wis.

By H. C. Bauer
 Probably the first Wisconsin commercial airplane line will be established in G. W. Clark will start from Milwaukee, Sept. 20 on a 500-amp. flight, avoiding stops at fourteen cities over a three

day period under the auspices of the Atlantic City-North American League post of Milwaukee.

At a recent meeting of the aviation division of the Civilian War Fund (details of the tour, which is to be one of the largest commercial air lines ever held, were perfected. The object of the tour is to promote interest in commercial aviation. It is also designed to boost the use of Milwaukee products throughout the state.

The tour flight will include ten planes, each carrying a pilot and five passengers, or a pilot and merchandise, the equivalent in weight to that of two passengers. Sixty-ton loads have already been loaded up for use of the planes which will make the flight. They are the Lashley-McMillen Oil Co., the Elko Ordnance Motor Co., the Wisconsin State, the Milwaukee-Lumber Co., the Milwaukee Journal, and the Cook Sales Co. The four other planes to make the flight will go to the front who first submit their contracts which comply with the regulations of the tour.

M. J. McMillen and E. P. Brown, sales director of the Alexander Engineering Airplane Company of Warren, Ohio, stepped in Milwaukee recently at the house of the company's local sales representative, F. W. Gaudin. They are making a sales-wide tour in an airplane piloted by H. C. Sholder. The company produces ten planes a day, and according to reports several new models are being developed and there are now sixty-four orders which cannot be filled until November.

The Brawley station in Milwaukee had some of the very latest New York newly announced and is then by air mail express for the Lashley-McMillen. The station also recognizes the value of transportation and 15 years ago to promote the development of air service the state had a journal of aviation, first sent to them in a Wright-Curtis airplane piloted by Farnham Fish, which was then the largest and fastest air delivery ever taken. This occurred on May 26, 1912.

Finger Lakes, Geneva, N. Y.

The Finger Lakes airport is a 4-way L shaped field, consisting of 52 acres and located approximately one mile from the American business section of the city. The larger is



Finger Lake Airport, Geneva, N. Y.

named "Shore" on the roof, with an arrow pointing north. The field is also marked with the elevation 500 ft. mark. The airport is directly located on a street and is on the main highway between Buffalo and Albany, route 5, known locally as New York's Greater Roadway. The field is in excellent condition, having been recently mowed and graded. Gasoline and all supplies are available at the field.

Bartholomew, Ohio.

By F. H. Davis
 The international relations meet planned to be staged in Bartholomew, Ohio, in October has been definitely postponed. Frank Phillips, author of all men and harbor of the west, has announced.

The AIRSEDAN



The Leader of the Top Flight Class

SPECIFICATIONS

Weight empty 1100 lbs.
 Wing Area 43 sq. ft.
 Wing Span 32 ft. 6 in.
 Length 28 ft.
 Fuel Load 100 lbs.
 Service Capacity Pilot and 4 Passengers

PERFORMANCE

High Speed (two level) 120 M.P.H.
 Landing Speed 41 ft.
 Cruising Speed 135 ft.
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POWER PLANT

Wright Whirlwind 13
 Horsepower 120 at 2,800 R.P.M.
 Fuel Capacity 70 gals.
 Oil Capacity 7 gals.

EQUIPMENT

Self Starter, Radio, Metal Propeller, Compass, Air Speed Indicator, Navigation Lights, Turnover, Altimeter, Clock, Fuel Regulator, Fuel Gauge, Forward and Aft Propeller Guards, Air Corps Theodolite, Sinker and Fuel Valve.

The Airsedan is not equipped with adjustable seat. Exceptional stability and balance under varying loads make this feature unnecessary.

Price \$12,500

Flyaway, Our Field

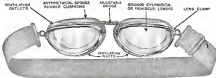
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|--|----------------------------------|-------------------------------------|-------|
| U. S. Air Service Model | EXTRA VOICE CONTINUOUS HEAD BAND | LEIGH Goggles No. 5 (Chicago Model) | 10.15 |
| With ground polished and colored lens white | | With lens and color white lens | 10.15 |
| With ground polished and colored lens black | 10.15 | With lens and color black lens | 10.15 |
| With ground polished and colored lens green | 10.15 | With lens and color green lens | 10.15 |
| With ground polished and colored lens blue | 10.15 | With lens and color blue lens | 10.15 |
| With ground polished and colored lens red | 10.15 | With lens and color red lens | 10.15 |
| With ground polished and colored lens yellow | 10.15 | With lens and color yellow lens | 10.15 |
| With ground polished and colored lens orange | 10.15 | With lens and color orange lens | 10.15 |
| With ground polished and colored lens purple | 10.15 | With lens and color purple lens | 10.15 |
| With ground polished and colored lens pink | 10.15 | With lens and color pink lens | 10.15 |
| With ground polished and colored lens brown | 10.15 | With lens and color brown lens | 10.15 |
| With ground polished and colored lens grey | 10.15 | With lens and color grey lens | 10.15 |
| With ground polished and colored lens black | 10.15 | With lens and color black lens | 10.15 |

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San Francisco, Cal.

By Charles W. Cooper

In accord with the Military Engineering and Management policy of fostering economy growth, steps have been taken by Representative Van Fleet to promote the development of San Francisco as an airport.

Golden, in words of the word "San Francisco" in white letters twice fast high with a large white arrow pointing north where space permits have been pointed on.



Head of the Market Street Railway Company's building, San Francisco, Cal., located in quiet place.

the roof of the Market Street railway buildings at Sutter street, Ocean and San Jose avenues, Twenty-eighth, Mission and Valencia streets, McAllister, Fulton and Central Avenue; Thirty-third Avenue and Concord street, and Third and Third street.

United States Army regulations were followed in size and style of signs. The details were worked out by Major Gen. J. M. Hines, in charge of the Ninth Corps area, the Air Service of the Pacific and various new in private life who formerly piloted airplanes. Among those who have expressed in maintaining this aid to aviation is William G. Starnes, who served as a major in the air service during the World War.

The new aviation guides, together with the marker at the Presidio and at the new municipal airport, will make San Francisco one of the best located cities in the country for pilots.

Philadelphia, Pa.

By Helen B. Fowler

The Pennsylvania Aeronautical Commission, last organized, is planning to compel every airplane pilot in the state to possess either a state or federal license before they can fly in Pennsylvania.

It is the plan of the Aeronautical Commission to enforce state registration of all airplanes not licensed by the Federal Government and all through registration of the planes and pilots will be demanded. The Commission will endeavor to adopt a program that will encourage new airports in the state and stimulate interest generally in aviation.

Representative W. Taylor and Major J. Owen, Philadelphia, members of the new State Aeronautical Commission, are behind this plan to make an interest by means in the state.

The new large air mail landing facilities have just been installed at the Philadelphia airport and are working out most satisfactorily. An airway beacon flanking the commercial code signals has also been installed. This flashes the letter "PA" for Philadelphia.

These facilities, some of which have been opened so that the airport will be prepared to meet any later-arriving there.

that any take advantage of the Evening Bulletin's price offer of \$25.00 for the first article also serve. Atlanta Press, a European capital to Philadelphia. This offer is good until Aug. 3, 1928.

High beams and red lights placed on the tops of the poles as an additional guide to streets in making a safe landing. Further landing lights are expected to be installed the latter part of September.

The Benjamin Franklin Company has just built another new larger on the landing field. It is thoroughly equipped with all the necessary apparatus to protect airplanes.

Due to the greatly increased interest in aviation of late, Temple University, Philadelphia, has been flooded with inquiries concerning the free course in aviation offered there this fall and winter under the direction of Federal air officials. Most of those asking about the course are young men, headed E. H. Henson, president of the university.

Joseph Gendler R. B. Hooten, who will direct the course, has been kept busy receiving students the past fortnight at his office in the Naval Aircraft Factory at the Philadelphia Navy Yard. More than 100 men have already been accepted for the course which is scheduled to open Sept. 20.

UNITED STATES AIR FORCES

Major Curry Goes to Langley Field

Major John F. Curry, Air Corps, acting assistant of the Material Division, Wright Field, Dayton, Ohio, has left for his new post at Langley Field, Va., where he will join the staff to manage the entire of maintenance of the Warfield School. Major Curry was for several years assigned with McCook Field and accompanied the Material Division in its move to Wright Field.

Ohio State Fair Has Aeronautics Exhibit

The aeronautics exhibit by the Army Air Corps featured the State Fair held at Columbus, Ohio, from Aug. 20 to Sept. 3. Over 500,000 persons visited the fair and a considerable number of them visited thousands of the opportunity to view the latest types of aircraft, various aeroplanes, etc.

The entire aeronautics display was housed in a building 300 by 500 ft. and the construction was designed to view these with utmost comfort. In this building there were also exhibits by the Navy, the Department of Commerce, and various aircraft manufacturers. Right of the latest types of Army planes were displayed, among them the O-3 and O-4 observation planes, the X-500A-1 altitude plane, the L-3-B Bomber, the P-1-C Training plane, the P-1-B Pursuit plane with biplane, etc. One of the exhibits was a three-engine, 200-400 ft. plane, recently constructed, and on which the fabric was not placed until the construction of the fair. This plane was fully equipped with bombs, machine guns, navigation instruments (including the earth inductor compass), radio compass, and a radio receiving and transmitting set. Radio programs were featured each day for the benefit of the visitors.

In addition to various types of aeroplanes, other equipment on display included various types of bombs, bomb racks, low velocity bombs, one of which was in actual operation on the roof of the building, the latter being apparatus as an airplane equipped for night flying, popular types of airplane radio receiving and transmitting sets, airplane instrument boards, showing identically the boards used by General MacArthur on his New York to Tokyo flight, and by Lieutenant MacArthur and MacArthur on their Hawaiian flight; various types of navigation instruments, some equipped with samples of photographs produced by using a 5,000 ft. observation balloon and a camera; and many other interesting items in operation at South Field, Ill., and the Ford Airport at Dearborn, Mich., an assortment of airplane wheels from the largest to the smallest; aluminum alloy castings, sections,

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Officers Eligible for General Staff

In a general order recently issued by the War Department giving a list of officers of the rank of captain or above who have been judged eligible for service with the General Staff Corps of the Army, the names of nine Air Corps officers are included. These are as follows:

Major Fred H. Calhoun, Michael E. Davis, Ernest M. Hickman, Hugh D. Jones, Thomas DeW. Kelling, Byron Q. Jones, Edgar H. Ligon, Louis Col. Seng D. Peckham and Capt. George C. Kinnery.

The officers of the various branches of the service placed on the eligible list were selected by a board of general officers, in compliance with the terms of Section 5 of the General Personnel Act, as amended by the Act of Congress, approved June 6, 1920, which specifies that a General Staff Corps eligible list, from which officers may be selected for service in that corps from other branches of the service, be created.

Mitchell Field, N. Y.

Plans for the construction of a modern barracks to accommodate 400 men have been completed and bids for construction work will be opened at Mitchell Field on Sept. 26.

New Training System at Brooks Field

A new system of training has been started at the Primary Flying School at Brooks Field, San Antonio, Tex., calling for a course of eight months in flying and airplane instruction instead of the six months' course taken by previous classes. In this new system students will receive intensive training, and students subject to transfer from Kelly Field, except specialized subjects, and a new emphasis on landings and landings—in addition to training prescribed by the old system. With Brooks Field moving to eight months' course, the advanced course given at Kelly Field is reduced from six to four months and will consist of specialized training only. Under the new system two classes will be trained at the same time, one being four months in advance of the other. A new class will be started the first day of March, July and November each year.



The photograph on the left shows one of the busy scenes of the EDO Factory. A modern factory and well equipped shops with the latest machine equipment especially well adapted for manufacturing of aircraft engine parts. A large capacity feature for the fast movement of aircraft engine parts. A large capacity feature for the fast movement of aircraft engine parts. A large capacity feature for the fast movement of aircraft engine parts.

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A number of officers on permanent and on temporary duty at Brooks Field were detailed to take the "introductory" course which is being given at Brooks Field, Texas. Several of the officers taking this course will, on completion thereof, be assigned to Mitchell Field, Cal., for duty.

The Marking of Airways

Secretary of Commerce Herbert C. Hoover has addressed the governors of all the states asking them to report upon the feasibility of commencing the marking of prominent structures in various states throughout the country on and off the air routes.

The Department of Commerce is urging supporting the work of prominent buildings everywhere in the United States. Instructions issued by the department regarding methods of marking are as follows:

The roads selected should be of tile, stone, iron or other solid, or of stone. Gravel and gravel roads should be avoided, if possible.

A simple black letter in slanting yellow with a dull black background should be used. If the road has a slope of over 30 deg, the sign should be painted on both sides.

The width of letters such as "W" or "P" should equal two-thirds their height, with other letters in proportion. A spacing of one-fourth the height should be used between letters. Letters should be not less than 6 ft. in height, preferably as large as possible. Letters less than this minimum cannot be seen at a comfortable height.

When gravel or gravel roads after the best location, wooden letters may be attached where the road or the sign may be painted on a dull black background covered of wood mixed on legs above the road surface.

The name of the city should be used, with an arrow pointing in the direction of the city's airport. Where road letters are used, the gravel road beneath should be as level as a green a darker gravel (dark gray or green).

It is of primary importance that these signs be illuminated at night. Gallery flood lights may be employed, the main-

Amphibian Landing Gear Competition

In order to encourage the development of aviation and to improve the efficiency of naval aeronautical material, as contemplated by Act of Congress, Public No. 446, approved 2 July 1924, the Secretary of the Navy invites the submission in competition, by sealed communication, of designs for Amphibian Landing Gears for aircraft.

Proprietors competition will be furnished identical specific information as to the conditions and requirements of the competition and as to the various features to be developed, together with the respective measures of merit that will be applied in determining the merits of the designs submitted in competition.

All designs and accompanying data must be placed in the mails and postmarked not later than midnight 3 December 1927.

Information will be furnished upon application to the Bureau of Supplies and Accounts, Navy Department, Washington, D. C.

T. W. LEUTZ.

Acting Paymaster General of the Navy

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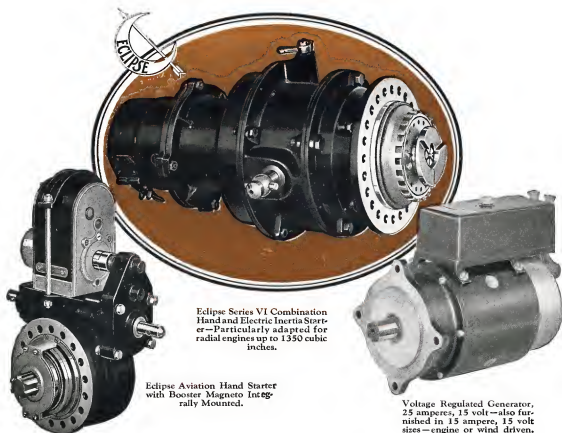
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